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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/659,753	09/10/2003	Jiro Yuzawa	00597/0200038-US0	3476

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EXAMINER	
LEUNG, RICHARD L	

ART UNIT	PAPER NUMBER
3744	

DATE MAILED: 11/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/659,753	YUZAWA, JIRO	
	Examiner	Art Unit	
	Richard L. Leung	3744	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 October 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claim 3 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. As amended, claim 3 recites the limitation, "R245fa is from 13.2 to 25 wt%...R508A or R508B is from 12 to 25 wt%, and R14 is from 12 to 25 wt%." However, there is no support for these claimed ranges in the specification. As disclosed on pages 2, 5, and 8 of the present specification, R245fa is from 17.4 to 50 wt%, R508A or R508B is from 13.2 to 36.4 wt% and R14 is from 13.2 to 36.4 wt%. Therefore, in extending the lower bounds of the specified ranges, the amended ranges recited in claim 3 have introduced new matter.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 2 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. The term "substantially" in claim 2 is a relative term which renders the claim indefinite. The term "substantially" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Therefore, it is unclear what is meant by the limitation, "substantially the same wt%."

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 2-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 1136540 A1 (Yuzawa) in view of WO 02/26913 A2 (Singh et al.) and US 5866029 (Lund et al.).

Regarding claim 2, Yuzawa discloses a non-azeotropic mixture refrigerant for use in a refrigerant circuit comprising a condenser 3, an evaporator 17, a compressor 1, and heat exchangers 8, 13, and 15, and gas-liquid separators 5 and 10 disposed in a multi-stage manner. The refrigerant mixture comprises R600 at 28.6 to 42.9 wt%, R125 at 10.7 to 28.6 wt%, R508A at 14.3 to 28.6 wt%, and R14 at 19.6 to 46.4 wt%. A specific example comprising R600 at 33.3 wt%, R125 at 21.3 wt%, R508A at 21.3%, and R14 at 24.4 wt% was also provided (column 3, lines 25-28). It was further disclosed that R508A could be replaced with R508B (column 5, lines 5-7). The weight percentages disclosed for R125, R508A or R508B, and R14 are considered to be

substantially the same wt% (see Response to Arguments below). Yuzawa, however, fails to include R245fa in the mixture as required by the claims. Singh et al. teaches the combining of a plurality of known refrigerants to form a multi-component refrigerant (page 11, lines 5-9) comprising R245fa (under *Propane Series* of Table I), R125 (under *Ethane Series* of Table I), R508A or R508B (under *Azeotropes* of Table III), and R14 (under *Methane Series* of Table I). It would have been obvious to one of ordinary skill in the art to include R245fa in the composition disclosed by Yuzawa because it is a well known refrigerant which can be used in combination with other refrigerants as taught by Singh et al. to form different multi-component refrigerants. More specifically, it would have been obvious to one of ordinary skill in the art to replace R600 in the refrigerant mix disclosed by Yuzawa with R245fa because it is known in the art that R245fa is significantly less flammable than R600 (butane) or other hydrocarbons as evidenced by Lund et al. on column 3, lines 21-24 and would therefore create a safer composition.

Regarding claim 3, Yuzawa discloses a refrigerant composition comprising R600 at 28.6 to 42.9 wt%, R125 at 10.7 to 28.6 wt%, R508A at 14.3 to 28.6 wt%, and R14 at 19.6 to 46.4 wt%, as already discussed above. It is therefore apparent that the claimed 12-25 wt% range specified in the claim for R125, R508A or R508B, and R14, have already been disclosed by Yuzawa since the ranges overlap. However, Yuzawa fails to disclose the use of R245fa at 13.2 to 25 wt%. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have replaced the R600 used by Yuzawa with R245fa as taught by Singh et al. and Lund et al. for at least the reasons already given above. While the specified range of 13.2 to 25 wt% is not

disclosed in any of the references, this limitation is deemed an obvious engineering design choice since no criticality has been demonstrated, as evidenced by Applicant's specification, which discloses an embodiment wherein R245fa is at 37.4 wt% (page 5, line 13) and further states that R245fa may be at 17.4 to 50 wt% (page 8, line 11). In other words, the range of 28.6 to 42.9 wt% disclosed by Yuzawa is well within the scope of Applicant's original disclosure and therefore the claim is still deemed obvious over the combination of Yuzawa, Singh et al., and Lund et al.

Regarding claims 4 and 6, Yuzawa fails to further include n-pentane at 0.1 to 12 wt%. In addition to the combination of R245fa, R125, R508A or R508B, and R14, Singh et al. teach the use of pentane in the refrigerant mixture under *Hydrocarbons* of Table II for use as a solubilizing agent, preferably at about 0.1 to about 10 wt% (page 7, lines 3-6). It is known in the art that pentane is merely a synonym of n-pentane. It would have been obvious to one of ordinary skill in the art to further include n-pentane at 0.1 to 12 wt% in the mixture disclosed by Yuzawa in order to dissolve lubricating oil in the refrigeration circuit so that it can be transported back to the compressor, as taught by Singh et al. (page 7, lines 1-6).

Regarding claim 5, Yuzawa discloses a refrigerant circuit, which is a single ultra-low temperature system comprising a condenser 3, an evaporator 17, a compressor 1, and further comprising first, second, and third intermediate heat exchangers 8, 13, and 15 and gas/liquid separators 5 and 10 disposed in a multi-stage manner. See Fig 1. The refrigerant circuit uses a refrigerant mixture comprising R600, R125, R508A or R508B, and R14, as already described above. It is understood from columns 3-4 that

the R125, R508A or R508B, and R14 are condensed and evaporated in the second and third intermediate heat exchangers 13 and 15 and the evaporator 17. Yuzawa fails to expressly disclose that the refrigerant circuit uses the mixtures recited in claims 2-4 and 6. As already discussed, the mixtures specified in claims 2-4 and 6 are obvious modifications of the mixture disclosed by Yuzawa.

Regarding claim 7, the combination of Yuzawa, Singh et al., and Lund et al., as already discussed above, demonstrate a refrigerant composition comprising R245fa, R125, R508A or R508B, and R14 wherein the wt% of R125, R508A or R508B, and R14 are within 10% of each other, as required by the claim.

Regarding claim 8, the specific weight percentages for R125, R508A or R508B, and R14 as recited by the claim fall within the already disclosed wt% ranges demonstrated by the combination of Yuzawa, Singh et al., and Lund et al, which are given above as being R125 at 10.7 to 28.6 wt%, R508A at 14.3 to 28.6 wt%, and R14 at 19.6 to 46.4 wt%.

Response to Arguments

8. Applicant's arguments, filed 26 October 2004, with respect to the objection to the specification have been fully considered and are persuasive in view of the amended paragraph. The objection of the specification has been withdrawn.

9. Applicant's arguments, filed 26 October 2004, with respect to the objections to claims 2 and 5 have been fully considered and are persuasive in view of the amendments. The objections of claims 2 and 5 have been withdrawn.

10. Applicant's arguments, filed 26 October 2004, with respect to the rejection of claims 2 and 4 on the basis of WO 02/26913 A2 (Singh et al.) under 35 U.S.C. 102(b) and 35 U.S.C. 103(a) have been fully considered and are persuasive in view of the amendment to claim 2. These rejections of claims 2 and 4 have been withdrawn.

11. Applicant's arguments, filed 26 October 2004, with respect to the rejection of claims 2-4 on the basis of EP 1136540 A1 (Yuzawa) in view of WO 02/26913 A2 (Singh et al.) and US 5866029 (Lund et al.) under 35 U.S.C. 103(a) have been fully considered but they are not persuasive.

Applicant asserts that the Yuzawa reference teaches a mixture comprising R500 at 93g, R125 at 60g, R508 at 60g and R14 at 69g. It should be noted that Yuzawa discloses the use of R600 (butane), not R500. Applicant further alleges that the wt% of R14 in the given example is substantially greater than the wt% of R125 and R508, and therefore does not teach the new limitation of claim 2 requiring the R125, R508, and R14 to be each of substantially the same wt%. However, this argument is not persuasive for at least the following reasons:

a. Applicant has not given a clear definition of what is meant by "substantially the same," thereby rendering the claim indefinite.

b. As mentioned in the rejections above, Yuzawa discloses a range of wt% that each component may have, and since these ranges overlap, the composition taught by the reference could clearly comprise components having substantially the same wt%.

c. In the example disclosed by Yuzawa and cited in Applicant's argument, R14 is at about 24 wt% and R125 and R508 are each at about 21 wt%, and therefore there is a difference of about 3% between R14 and each of the other two components. The newly added claim 7, which is dependent on claim 2, requires that the wt% of R125, R508, and R14 to be within 10% of each other. Therefore, it can be logically reasoned that if a difference of 10% is considered

> by the Applicant to be "substantially the same wt%," then certainly the 3% difference demonstrated by Yuzawa should also be considered to be "substantially the same."

Yuzawa fails to disclose the use of R245fa, and Singh et al. is relied on for teaching the use of R245fa. Singh et al. teach a plurality of refrigerant compositions and recites on page 11, lines 5-9:

> The compositions of the present invention may comprise any specific combination of any one or more refrigerants listed in Table I, Table III, and/or Table IV with any one or more solubilizing agents listed in Table II. Therefore, each and every possible specific combination of listed refrigerants and solubilizing agents is considered independently enabled as an embodiment of the present invention.

R245fa, R125, R508A or B, and R14 are clearly included in those recited tables and therefore Singh et al. demonstrates that a refrigerant composition comprising those components is already known in the art. In response to applicant's argument that there is no suggestion to combine the references, and therefore the combination is improper, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the reference of Lund et al., which Applicant has failed to address, provided specific motivation. As mentioned in the rejections, Lund et al. expressly teach that HFC-245fa (i.e. R245fa) is less flammable in comparison to hydrocarbons. Since Singh et al. establishes that the combination of R245fa with the other claimed components is already known in the art, it would have

been obvious to one of ordinary skill in the art at the time the invention was made to have replaced the flammable hydrocarbon R600 used by Yuzawa with R245fa.

Yuzawa also fails to disclose the use of n-pentane, and again Singh et al. is relied upon to teach the use of n-pentane. In response, Applicant has again alleged that the combination of these references is improper, but gives no specific support as to why such a combination is improper in regards to the teaching of using n-pentane. As mentioned in the rejections, Singh et al. expressly teaches the use of a solubilizing agent from about 0.1 to 10 wt% in the refrigerant composition to dissolve any lubricating oil, and Singh et al. teaches the use of pentane (i.e. n-pentane) as a suitable solubilizing agent in Table II. Therefore, the mere assertion that the combination of references is improper is not persuasive since the motivation to combine is expressly given by Singh et al. Applicant further asserts that Lund et al. is relied upon to teach the use of n-pentane. It is respectfully pointed out that no such reliance on Lund et al. was made.

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard L. Leung whose telephone number is 703-306-4154. The examiner can normally be reached on Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Denise L. Esquivel can be reached on 703-308-2597. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Richard L. Leung
Examiner
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rll

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